



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :  
H04M 15/00

A1

(11) International Publication Number: WO 98/19448

(43) International Publication Date: 7 May 1998 (07.05.98)

(21) International Application Number: PCT/SE97/01795

(22) International Filing Date: 28 October 1997 (28.10.97)

(30) Priority Data:  
9603932-6 28 October 1996 (28.10.96) SE

(71) Applicant (for all designated States except US): TELEFON-  
AKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126  
25 Stockholm (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): FOGELHOLM, Rabbe  
[SE/SE]; Turevågen 54B, S-191 47 Sollentuna (SE). SVED-  
BERG, Johan [SE/SE]; Värtavägen 6, S-115 24 Stockholm  
(SE).

(74) Agent: TELEFONAKTIEBOLAGET LM ERICSSON; Patent  
and Trademark Dept., S-126 25 Stockholm (SE).

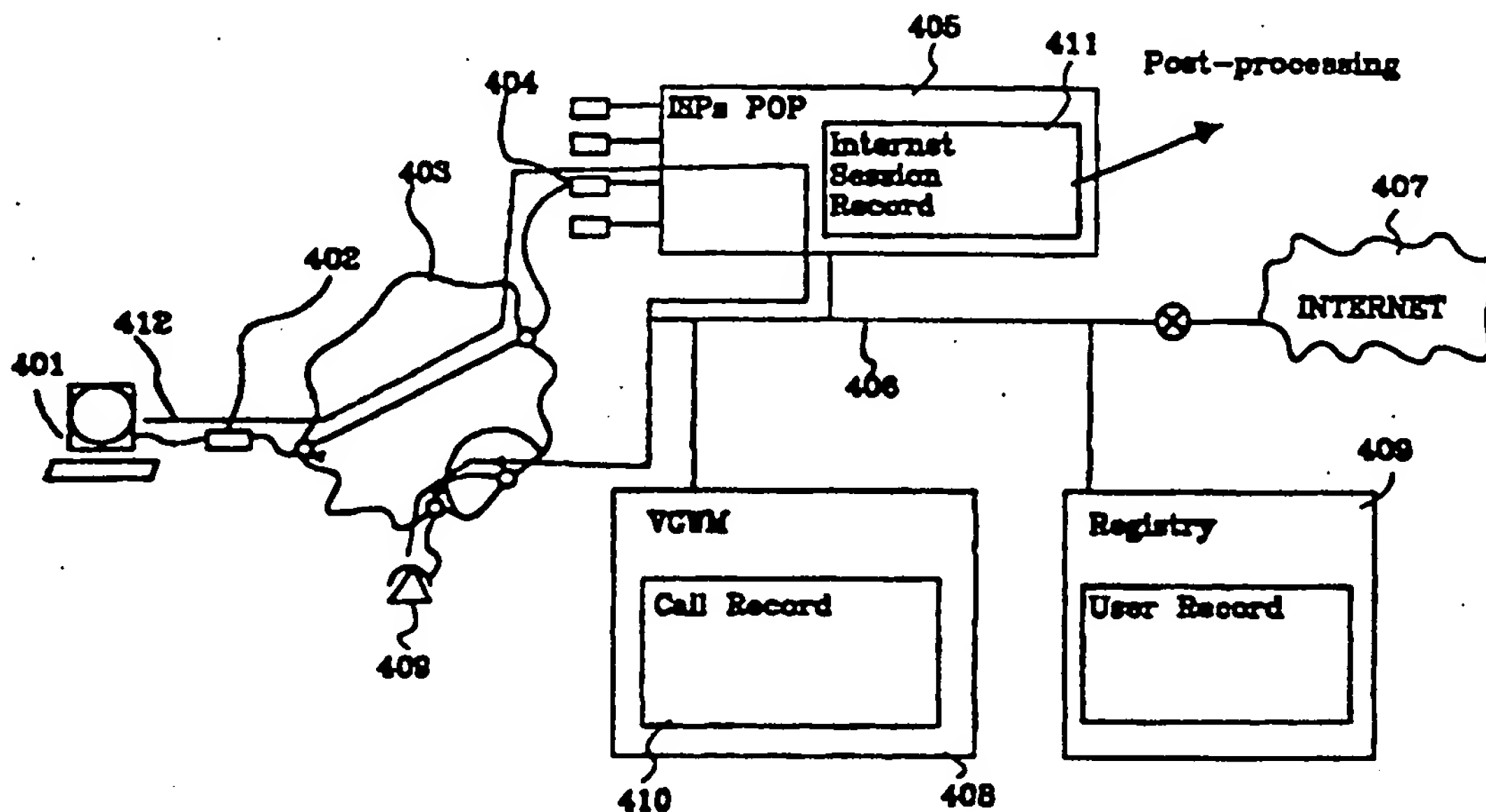
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR,  
BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE,  
GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK,  
LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO,  
NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR,  
TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH,  
KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ,  
BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE,  
CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,  
PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,  
ML, MR, NE, SN, TD, TG).

Published

With international search report.

Before the expiration of the time limit for amending the  
claims and to be republished in the event of the receipt of  
amendments.

(54) Title: A METHOD AND APPARATUS FOR CHARGING FOR AN OUTGOING VOICE CALL PERFORMED DURING AN INTERNET SESSION



(57) Abstract

The present invention discloses a method and an apparatus for solving the problem with how to be able to charge for an outgoing voice call placed by a subscriber who is simultaneously performing an internet session. The problem is solved by creating a table and associating the IP-address, which ordered the call, with the duration and the destination of the call.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TC	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MX	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

A METHOD AND APPARATUS FOR CHARGING FOR AN OUTGOING VOICE CALL PERFORMED DURING AN INTERNET SESSION

The present invention relates to Internet and telecommunication in general and to charging in particular

DESCRIPTION OF RELATED ART

5 A telephone user, hereafter called a subscriber, may, by using a modem, connect to an ISP (Internet Service Provider) and thus get access to the Internet through his regular voice telephone. The drawback is that while the subscriber is using his internet account (surfing) his phone is busy and therefore will anyone  
10 dialling to the subscriber get a busy-tone. This can be solved as described in the Swedish application SE-9602212-4 by forwarding calls directed to the subscriber to a voice gateway. The voice gateway handles the translation between voice and internet and the subscriber will receive a message indicating a waiting voice  
15 call and can connect to the calling party using state-of-the-art voice-over-internet technology. This way the subscriber may simultaneously be connected to internet and using his voice phone.

The subscriber may also place an outgoing call through the voice  
20 gateway in a similar manner. For a deeper description of the above mentioned ideas please refer to SE-9602212-4.

When the subscriber places a voice call using the voice gateway, it seems, from the network operators point of view as if the voice gateway made the call and thus should be charged for the  
25 call. This is of course not acceptable but is not solved in the related art.

### SUMMARY OF THE INVENTION

The present invention disclose a method and a apparatus for solving the problem with how to be able to charge for an outgoing voice call placed by a subscriber who is simultaneously  
5 performing an internet session.

The purpose of the present invention is thus to be able to charge for an outgoing voice call, placed by a subscriber during an internet session.

The problem, described above, regarding how to charge a  
10 subscriber for an outgoing call placed during an ongoing internet session is solved by in a call record associate the destination and duration of the outgoing call with the user. This association can be based on the users A-number, user-id, Ip-adress etc.

### BRIEF DESCRIPTION OF THE DRAWINGS

15 Figure 1 shows in overview a logical network model.  
Figure 2 shows in more detail the phone-doubler and its interfaces.  
Figure 3 displays a physical network model.  
Figure 4 shows an overview of a preferred embodiment according to  
20 the invention.

### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

I the following description, for purposes of explanation and not limitation, specific details are set forth, in order to provide a thorough understanding of the present invention. However, it will  
25 be apparent to one skilled in the art that the present invention may be practised in other embodiments that depart from these specific details. In other instances, detailed descriptions of well known methods, devices, and circuits are omitted so as not

to obscure the description of the present invention with unnecessary detail.

In figure 1 is a general overview of the surroundings of the network and how the phone-doubler interfaces with its neighbours.

5 With 101 is a user who is connected to the phone-doubler 102 denoted. The phone-doubler 102 is also connected to the ISP (Internet Service Provider) 103, to the ISDN (Integrated Services Digital Network) 104 and to ISP-adaptations 105. Such adaptations could for instance be a PCAU (PSTN Control Adaptation Unit) 106.  
10 The PCAU 106 is a unit that mediates between phone-doubler 102 and the network operators PSTN network, for the purpose of activation and deactivation of call diversions. Call diversion is an integral part of the workings of the phone-doubler. Another adaptation unit can be a CCAU (Customer Care Adaptation Unit)  
15 107, which is a unit that mediates between phone-doubler 102 and the customer care system of the ISP. The last adaptation unit shown in figure 1 is the BCAU (Billing Centre Adaptation Unit) 108, which is a unit that mediates between phone-doubler 102 and the billing centre of the ISP.

20 In figure 2 a more detailed description of the inner working of the phone-doubler and its interfaces is shown. The user 201 is still present and is utilising the phone-doubler 202 through an UI (User Interface) 203. The UI could for instance be a Microsoft Windows application giving the user a windows user interface for  
25 handling the phone-doubler services. The user is using a client software 204 which could be the just mentioned windows application handling the communication with the gateway 206 over a CLGI (Client Gateway Interface) 205. The gateway 206 is located on the ISP 209 premises. The gateway 206 can be located at  
30 different geographical locations. The gateway 206 comprises a gateway registry 207 which is common to all subscribers to the phone-doubler services, and at least one VGWM (Voice GateWay

Module) 208. The VGWM 208 processes the call and speech transmissions and can handle several calls simultaneous.

The ISP has for operation and maintenance a OMI (Operation and Maintenance Interface) 210 to the phone-doubler 202. An PRI (Primary Rate Interface) 211 connects the phone-doubler 202 with the ISDN 212.

For communication between the phone-doubler 202 and the ISP-adaptations 213 a number of different interfaces are used. PCAI (PSTN Control Adaptation Interface) 214 for communication with PCAU 215, CCAI (Customer Care Adaptation Interface) 216 for communication with CCAU 217 and BCAI (Billing Centre Adaptation Interface) for communication with BCAU 218.

The client 204 is running on a PC (Personal Computer) 301 in figure 3, located at the users premises 302 and connected to the ISP's POP (Point Of Presence) 303, at the ISP's premises 304 via a modem 305 and PSTN 306. The PC 301 is given an IP-address 307 by the ISP. This is normally done dynamically when connecting to the POP 303. The users normal telephone line 308 is used for connecting between the modem 305 and the PSTN 306.

One or several VGWM 309 is connected to the ISP's IP network 310, typically on the same switched Ethernet as the POP but not necessarily. Each VGWM 309 has its own IP-address, and the registry 311 may have an IP-address of its own, or share the IP-address of one of the VGWM's 309.

Each VGWM 309 is connected to ISDN 312 via PRI.

One registry node 311 can handle several VGWM 309. The registry node 311 can physically be remotely placed. An ISP can have one central registry node 311 and several distributed VGWM 309.

The client 204 in figure 2 stores a number of different data items such as:

- Country code
- Area code (including trunk prefix)
- 5 • Telephone number (local number)
- Service preferences
- client IP address (volatile)
- Hostname of registry
- VGWM IP address (volatile)
- 10 • ISDN number to VGWM cluster (this may be a group number)
- Reject incoming calls (volatile, settable from the GUI)

The combination of country code, area code, and local number identifies each subscriber uniquely.

- The VGWM IP address attribute also represents the state of the client: A null address indicates that the client is signed-off from the phone-doubler service, any other address indicates that the client is signed-on.

The registry 311 holds a subscriber record for each client, where each record comprises the following attributes:

- 20 • telephone number (key, persistent, made up from country code, area code, and local number)
- password (persistent, stored with a one-way function encryption)
- client IP address (secondary key, volatile)
- 25 • user id (persistent)
- service preferences (persistent)
- number of sign-on (persistent)
- number of incoming calls (persistent)
- number of outgoing calls (persistent)



- first sign-on (persistent)
- last sign-on (persistent)

The client IP address attribute also represents the state of the subscriber record, a null IP address states that the client 204  
5 is signed-off, any other address states that the client 204 is signed-on.

When a user 201 is connected to the Internet, the IP address of the client 307 is entered into the subscriber record. Since both the telephone number and this IP address are keys, an PSTN-to-IP  
10 association between the telephone number and IP address is maintained in the subscriber record.

Whenever an event occurs in the phone-doubler service relating to the registry, a record is created in the registry 311 and stored in the registry log. The registry log contains records of events,  
15 relating to the session that takes place between a sign-on and a sign-off. A registry log record is created when a subscriber record changes state to signed-off, or when a subscriber record is deleted. The registry log record comprises the following attributes:

- 20 • Record id (sequence number)
- Termination date (timestamp of session termination)
- Client IP address
- user id
- User's telephone number
- 25 • Sign-on date
- Duration
- Number of incoming calls
- Number of outgoing calls
- Termination code (indicating which normal event or exception  
30 that terminated the session)



The phone-doubler can have one or several VGWM's. Each of these VGWM's holds a record of each call or call attempt made through that particular VGWM. The call record may comprise the following attributes:

- 5   • Record id (per-VGWM sequence number)
- Date and time (timestamp of the completed log record)
- Client IP address and port
- User's telephone number
- Direction (incoming or outgoing)
- 10   • VGWM IP address and port
- VGWM ISDN number
- B-number (same as user's telephone number for incoming call)
- Call set-up date and time
- Duration
- 15   • Sent packages
- Received packages
- Answer state. Answered, rejected or not answered
- Termination reason. User, client, ISDN or VGWM.

20   To be able to achieve a connection between an outgoing call from the VGWM 309 and the user 201 for the purpose of charging the user 201 for the call, the users telephone number 308 can be picked up by the POP 303 and transferred to the VGWM 309. The VGWM will store the A-number in a call record in the call log. The call log will then be sent to the post-processing system of  
25   the ISP and possibly incorporated in the users 201 telephone bill.

If, for one reason or another, a secure A-number can not be picked up by the POP 303, the user 201 could be enabled to state his A-number by himself. This introduces, however a risk of  
30   fraud, for instance if one phone-doubler user states the A-number

of another phone-doubler user, the second phone-doubler user would be charged for the outgoing calls placed by the first phone-doubler user. This can be solved by also requiring a that the A-number is accompanied with a personal password. That is, when a user 201 signs-on, he has to state his A-number together with a password. The registry 207 handles the authentication of the password and if the authentication was good the A-number is stored in the registry 207 log.

To even more increase the security, the A-number could be verified by a call-back procedure. This means that the phone-doubler calls the user, after the user has signed-on to verify the A-number the user stated in the sign-on procedure. Different schemes can be used for achieving this without too much work for the user 201, for instance can the registry 207 detect a new user at the initial sign-on, where the user 201 states his password and A-number. The registry 207 ask the user 201 to finish his internet session, connect an ordinary telephone set to his line, dial the VGWM 208 and hang up. The VGWM 208 picks up the A-number presented in the call and hand it over to the registry 207, which unlocks the subscriber record for this A-number.

In another preferred embodiment the charging of outgoing calls is instead based on the IP-number of the user. For each call log record in the VGWM 309 which comprises a successful outgoing call find the identity of the user 201 who made the call. This can be achieved by comparing the POP 303 log for the record of an internet session with the same IP-number as that of the call record in the VGWM 309 and a time span that encompasses that of the outgoing call. The internet user 201 is then charged according to the dialled B-number and the duration of the call. The amount due is added to the users 201 internet bill. The comparison between the VGWM 309 call records and the POP 303 log can be done at the ISP's post-processing system.

In another preferred embodiment the user 201 is authenticated by the registry 207 with a user-id and a password. When the user 201 wants to place an outgoing call the client 204 establish contact with the registry 207 submitting the requested B-number. The  
5 registry authenticate the user 201 and selects an appropriate VGWM 208 for handling the outgoing call. The VGWM creates a call record based on the user-id transmitted by the registry 207 to the VGWM 208. The user can then be charged on the normal Internet account using the ISP's 209 post-processing system and the call  
10 record in the VGWM 208. In this preferred embodiment it is, thus, the registry 207 which handles the authentication and no direct contact between the client 204 and the VGWM 208 is necessary.

In figure 4 a user with a client is referred to as 401. The user 401 is connected to Internet 407 via a first modem 402, the PSTN  
15 network 403, a second modem 404 at the ISP, the ISP's POP 405 and through the ISP LAN 406. The ISP has for each Internet account an specific session record 411 identifying the data for the Internet sessions, such as for instance duration. When the user 401 wants to place an outgoing call, the client 401 take contact with, in  
20 one preferred embodiment the VGWM 408, and in another preferred embodiment the registry 409. An authentication procedure further described above takes place and the VGWM 408 calls the requested subscriber 409. The VGWM records the specifics about the call in a call record 410. If the subscriber 409 answers the phone, a  
25 call 412 is set-up from the user 401 to the subscriber 409 via the VGWM 408. The call is transported on a IP-based network from the user 401 to the VGWM 408 and on a traditional telecom network from the VGWM 408 to the subscriber 409. After the call 412 is finished the call record in the VGWM 408 is completed. The ISP  
30 collects the call records 410 together with the session records 411 and can by using a post-processing system charge the user 401 for the outgoing calls by identifying the user 401 either by user-id, IP-adress, A-number etc.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one  
5 skilled in the art are intended to be included within the scope of the following claims.

## CLAIMS

1. A method for charging a subscriber for outgoing voice calls performed during an internet session, CHARACTERISED in that a first association between said subscriber and said outgoing voice call is established, that the cost for said outgoing voice call is established and that said subscriber is charged with said cost.
2. A method according to claim 1, CHARACTERISED in that a second association between said subscriber and said internet session is established, that the cost for said outgoing call is associated with said internet session and that the cost for said internet session is charged to said subscriber.
3. A method according to claim 2, CHARACTERISED in that an IP-address is associated with said subscriber for said internet session and stored in a Internet session record, that said IP-address is transferred to a VGWM together with a A-number, that said VGWM connect said subscriber with a second subscriber defined by said A-number, that said VGWM, records and stores, in a call record, at least, said A-number, said IP-address and the duration of the call, that said call record and said internet session record are processed to charge the subscriber for said outgoing call.
4. A method according to claim 2, CHARACTERISED in that an user-id is associated with said subscriber for said internet session and stored in a Internet session record, that said user-id is transferred to a VGWM together with a A-number, that said VGWM connect said subscriber with a second subscriber defined by said A-number, that said VGWM, records and stores, in a call record, at least, said A-number, said user-id and the duration of the call, that said call record

and said internet session record are processed to charge the subscriber for said outgoing call.

5. A method according to claim 1, CHARACTERISED in that the A-number of said subscriber is received, that the cost for said outgoing call is associated with said A-number and that the subscriber is charged with the costs associated with said A-number.
6. An apparatus for charging a subscriber for outgoing voice calls performed during an internet session, CHARACTERISED in a call record comprising a first association between said subscriber and said outgoing voice call, means for calculating the cost for said outgoing voice call and means for charging said subscriber with said cost.
7. An apparatus according to claim 6, CHARACTERISED in a internet session record comprising a second association between said subscriber and said internet session, means for associating the cost for said outgoing call with said internet session and means for charging the cost for said internet session to said subscriber.
8. An apparatus according to claim 7, CHARACTERISED in that said internet session record comprises an IP-adress and means for uniquely identifying said subscriber, means for transferring said IP-adress to a VGWM together with a A-number, that said VGWM is arranged to connect said subscriber with a second subscriber defined by said A-number, that said VGWM is arranged to record and store, in a call record, at least, said A-number, said IP-adress and the duration of the call, means for processing said call record and said internet session record and to charge the subscriber for said outgoing call.

9. An apparatus according to claim 7, CHARACTERISED in that said internet session record comprises a user-id and means for uniquely identifying said subscriber, means for transferring said user-id to a VGWM together with a A-number, that said VGWM is arranged to connect said subscriber with a second subscriber defined by said A-number, that said VGWM is arranged to record and store, in a call record, at least, said A-number, said user-id and the duration of the call, means for processing said call record and said internet session record and to charge the subscriber for said outgoing call.
10. An apparatus according to claim 1, CHARACTERISED in means for receiving the A-number of said subscriber, means for associating the cost for said outgoing call with said A-number and means for charging the subscriber with the costs associated with said A-number.



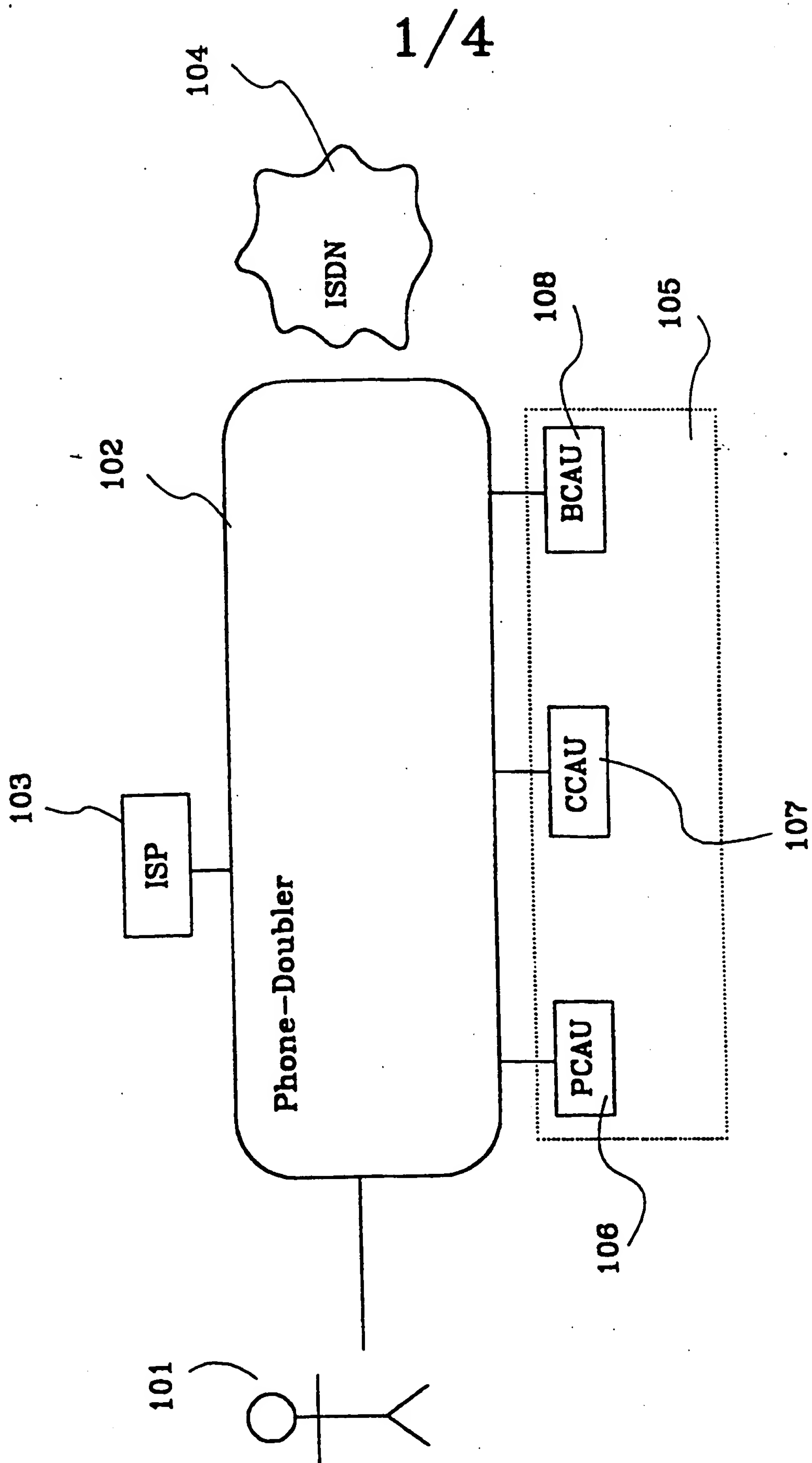


Fig 1

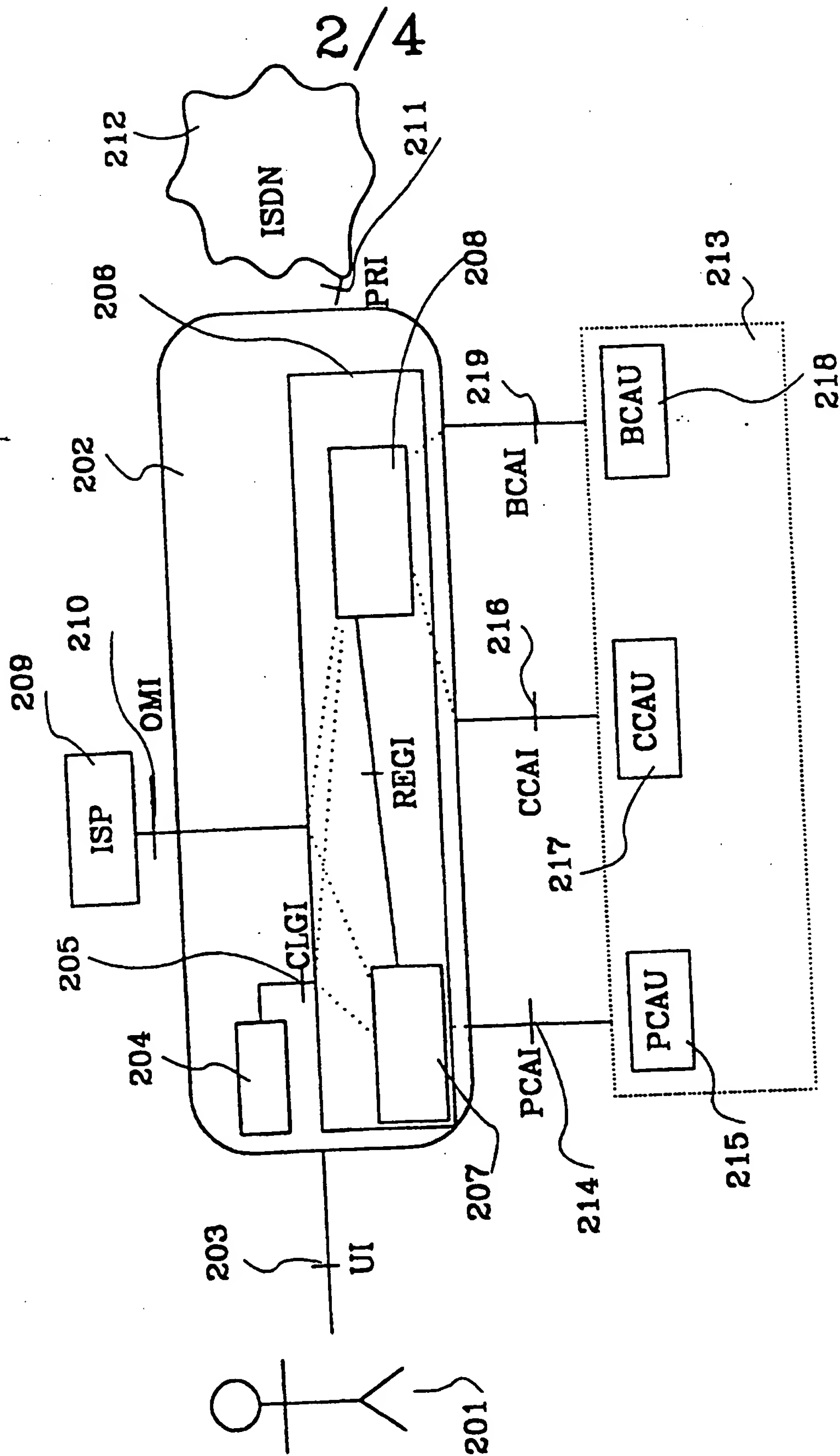


Fig 2

3/4

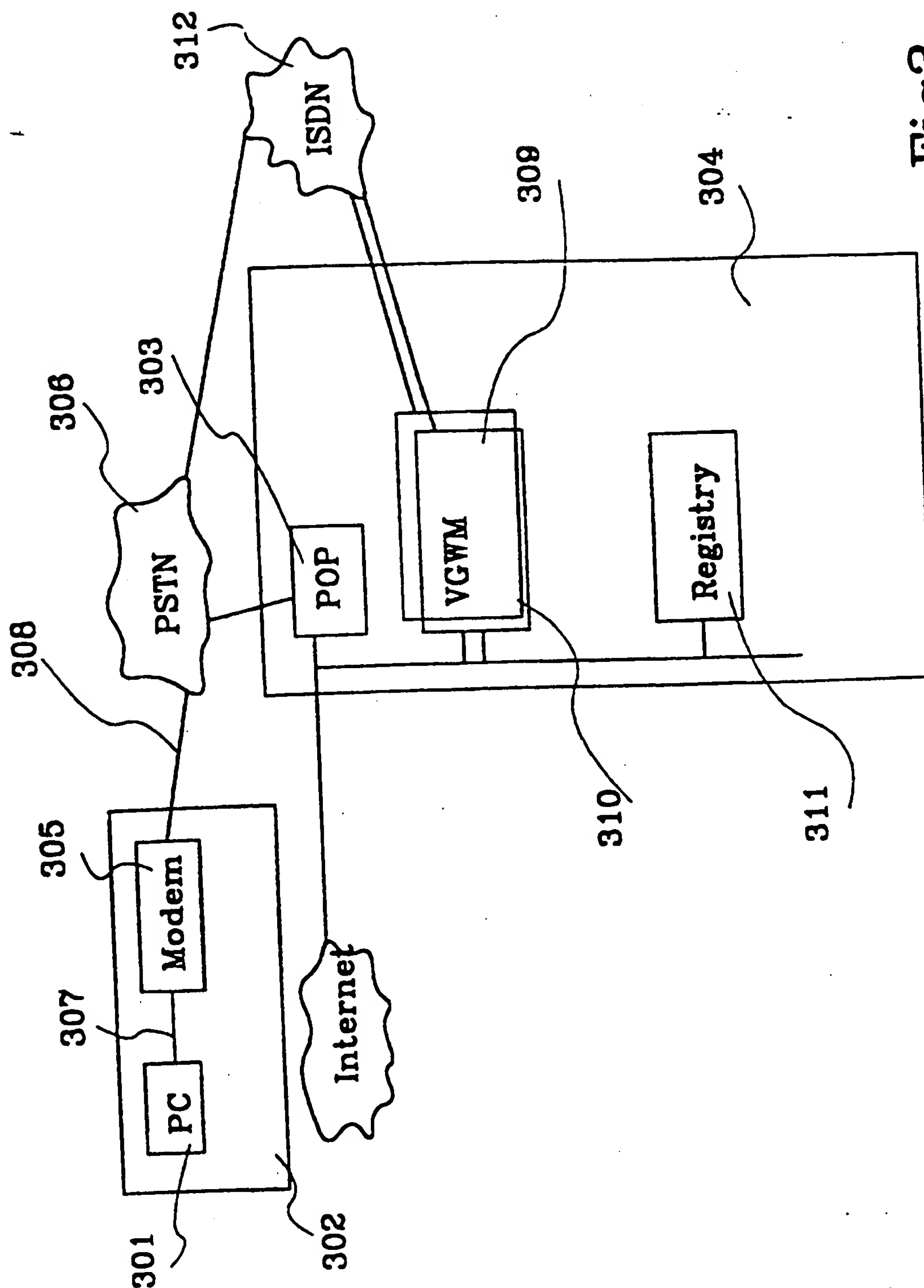


Fig3

4/4

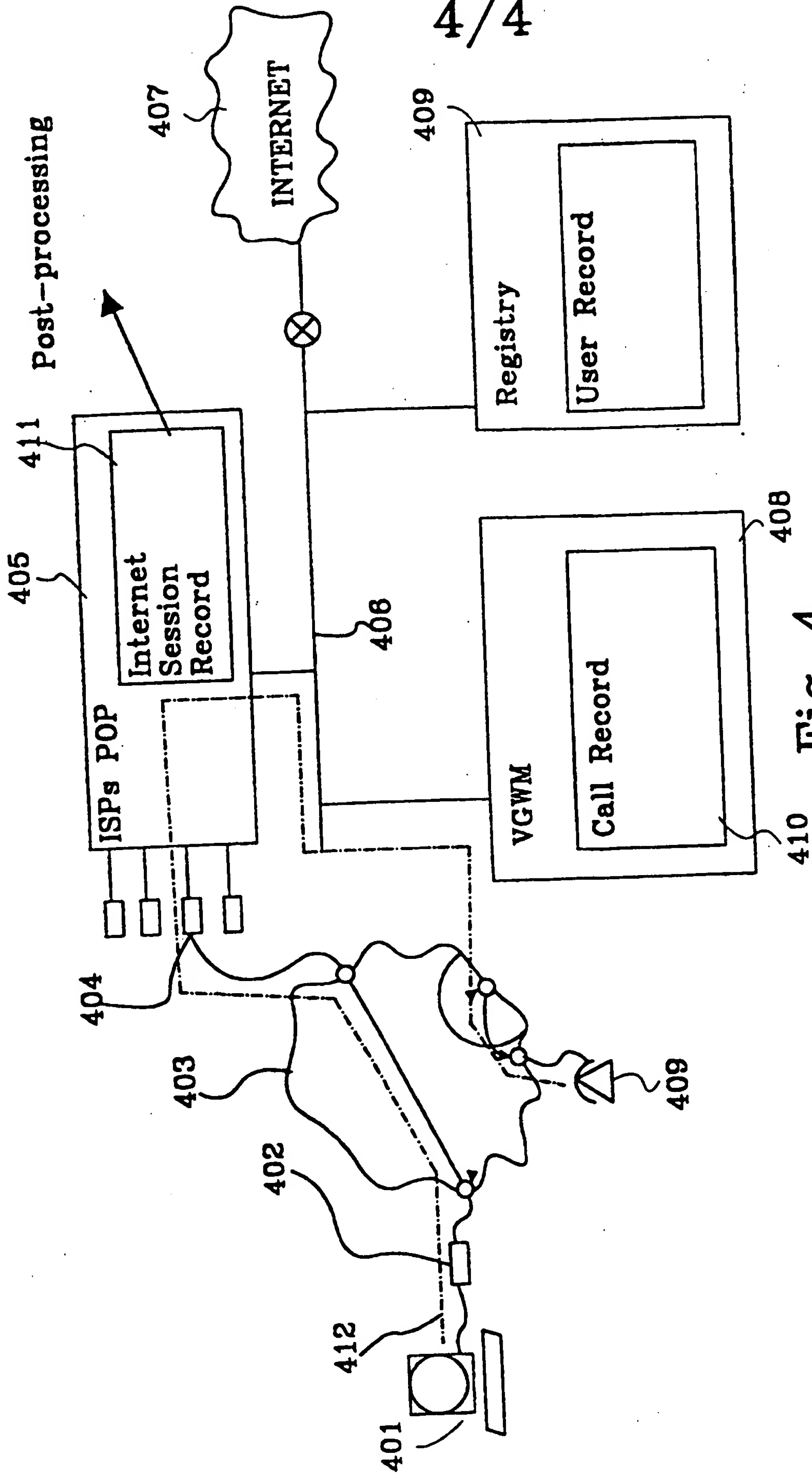


Fig 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/01795

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 15/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0706279 A1 (KONINKLIJKE PTT NEDERLAND N.V.), 10 April 1996 (10.04.96), column 1, line 50 - column 4, line 4	1,2,5,6,7,10
A	--	3,4,8,9
Y	BYTE, Volume 21, No 2, February 1996, NATHAN MULLER, "DIAL 1-800-INTERNET" page 83 - page 88	1,2,5,6,7,10
A	--	3,4,8,9

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*B\* earlier documents not published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*Z\* document member of the same patent family

Date of the actual completion of the international search

3 April 1998

Date of mailing of the international search report

07-04-1998

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Cecilia Sandell  
Telephone No. +46 8 782 25 00